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(71) Applicant (for all designated States except US):
COLLINS & AIKMAN AUTOMOTIVE COMPANY
INC. [US/US]; 350 Stephenson Highway, Troy, MI 48083
(US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): WARNER, Donald,
H. [US/US]; 38 Avonwood Boulevard, Rochester Hills, MI
48309-2046 (US).

(74) Agents: GROSSMAN, Steven, J. et al.; Grossman,
Tucker, Perreault & Pfeiffer, PLLC, 55 South Commercial
Street, Manchester, NH 03101 (US).

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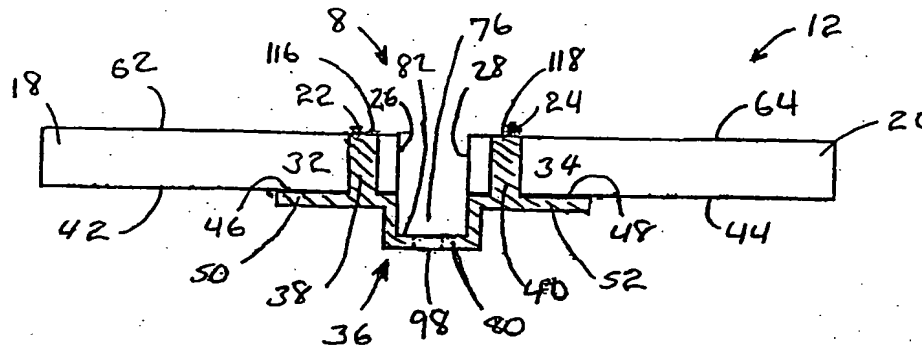
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(54) Title: JOINT ASSEMBLY FOR A TRIM PANEL



(57) Abstract: A joint for a trim panel comprising a first and second outer cover having an inner surface, an outer surface and a connector portion formed therein, and a connector platform. The connector platform comprises a first connector portion and a second connector portion, the first connector portion connected to the first outer cover connector portion and the second connector portion is connected to the second outer cover connector portion.

FIELD OF THE INVENTION

5 This invention generally relates to motor vehicle trim panels having multiple cover portions and a method for joining the multiple cover portions. Motor vehicle trim panels may be comprised of multiple colors, materials, textures and the like. More particularly, the invention relates to an apparatus and method for forming a joint line having a pleasing appearance between these multiple cover portions.

BACKGROUND OF THE INVENTION

10 It is well known to provide trim panels to cover the interior surfaces of motor vehicles, as well as other modes of transportation, to enclose sharp edges, improve aesthetics and reduce outside noise. Early on, these trim panels were metal or hard plastic components, but as vehicle interiors became more friendly, comfortable and luxurious, softer materials and combinations of leather, cloth, textiles, plastic skins with foam backing and injection molded plastics became the norm. These softer, and often padded, trim panels are generally mounted in a vertical orientation around the inner walls of the vehicle body forming the passenger compartment. To further improve the aesthetics of vehicle interiors, it is preferred to minimize the number of joint lines or opportunities for uneven unsightly gaps that may be present. Dimensional registration of adjoining trim panels is often problematic as these panels must be mounted such that their class A surfaces are flush in the vehicle and any gaps between the panels are narrow and uniform. Thus, fewer larger panels rather than multiple smaller trim panels are used, however the larger panels must meet a wider combination of environmental and use requirements. This has led to the creation of a "belt line" or midpoint vertically on the panels which distinguishes the need for the panel to have certain properties on their upper surface nearer the vehicle windows than closer to the floor. The upper surfaces of these vertical trim panels are generally lighter in color and softer than the surfaces which are below the midpoint or belt line and which are more likely to be soiled, scuffed or kicked. In addition, the upper surfaces undergo more sunlight exposure through the glass of the vehicle (greenhouse effect) which requires that they be made from more expensive weather-resistant materials.

This has led to the need to provide vehicle trim panels which combine multiple colors, multiple textures and multiple materials into a single larger trim component. Finishing the joint line between these multiple materials has remained problematic, especially when a smooth and aesthetically pleasing "class A" finish is desired. To improve the aesthetic appearance of such trim panels, it is desired to create the appearance of a smooth flowing joint line with accurate dimensional registration in all three axes so that non-uniform gaps to adjacent panels are not created.

SUMMARY OF THE INVENTION

A joint for a trim panel comprising a first outer cover having an inner surface, an outer surface and a connector portion formed therein, a second outer cover having an inner surface, an outer surface and a connector portion formed therein, a connector platform having a first connector portion and a second connector portion, the first connector portion connected to the first outer cover connector portion and the second connector portion connected to the second outer cover connector portion.

A joint for a trim panel comprising a first outer cover having an inner surface, an outer surface, a joint line edge and a connector portion formed therein, the connector portion comprising a plurality of receptacles disposed along the first outer cover joint line edge, the receptacles comprising through holes, a second outer cover having an inner surface, an outer surface, a joint line edge and a connector portion formed therein, the connector portion comprising a plurality of receptacles disposed along the second outer cover joint line edge, the receptacles comprising through holes. A connector platform is supplied having a first connector portion and a second connector portion, the first connector portion comprising a plurality of protrusions and the second connector portion comprising a plurality of protrusions, wherein the protrusions of the first connector portion of the connector platform extend into the receptacles of the first outer cover to form a connection between the connector platform first connector portion and the first outer cover connector portion. The protrusions of the second connector portion of the connector platform extend into the receptacles of the second outer cover to form a connection between the connector platform second connector portion and the second outer cover connector portion.

A trim panel comprising a first outer cover, a second outer cover, a connector platform, a joint comprising said first outer cover and said second outer cover connected to

said connector platform, a substrate held in spaced relationship to said first outer cover and said second outer cover, said spaced relationship comprising foam.

A trim panel comprising a first outer cover, a second outer cover, a connector platform, a joint comprising said first outer cover and said second outer cover connected to said connector platform, a substrate formed directly behind said first outer cover and said second outer cover, comprising a reaction injection molded plastic composition.

A method for forming a joint for a trim panel comprising, providing a first outer cover having an inner surface, an outer surface and a connector portion formed therein, providing a second outer cover having an inner surface, an outer surface and a connector portion formed therein, providing a connector platform having a first connector portion and a second connector portion, connecting the first connector portion to the first outer cover connector portion and connecting the second connector portion to the second outer cover connector portion.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the invention will become apparent upon consideration of the description of the invention and the appended drawings in which:

FIG. 1 is a representative perspective view of a trim panel according to the present invention;

FIG. 2 is a partial cross-sectional view of FIG. 1 taken along line 2-2;

FIG. 3 is a plan view of the outer cover portions and connector prior to assembly;

FIG. 4 is a partial cross-sectional of the outer cover portions and connector after assembly; and

FIG. 5 is a partial cross sectional view of the trim panel of FIG. 1 in a foam mold prior to introducing foam material.

The above and other objects, features, and advantages of the present invention will be apparent in the following detailed description thereof when read in conjunction with the appended drawings wherein the same reference characters denote the same or similar parts throughout the several views.

DESCRIPTION OF THE INVENTION

This invention provides a trim panel assembly that includes a variety of different outer cover portions attached to, located and retained by a connector platform which forms a joint. The connector platform is positively located in a foaming mold to assure three dimensional location of the joint line. Following foaming in place to attach the outer cover portions to a substrate, the connector platform may be fitted with a joint cover to yield a finished trim panel. In accordance with this invention, a method is provided for accurately attaching and locating multiple outer cover portions to a connector platform that defines the finished trim panel joint line. The present invention assures that any combination of materials, skin, cloth, textile, molded hard plastic, etc. can be combined to form an aesthetically pleasing trim panel.

According to another aspect of the invention, the connector platform with outer cover portions attached is positively located in a foaming mold to register the outer cover portions and joint line to the substrate and trim component periphery. According to another aspect of the invention, in the final assembled condition, a joint cover is applied over the connector platform to yield the desired appearance.

An alternate preferred embodiment of the invention uses the platform connector as the final joint cover or trim bezel by inverting the assembly procedure of the platform connector to the outer cover portions. The platform connector would then extend from the outer surface of the outer cover portions through the inner surface of the outer cover portions. In this embodiment, a locating groove in the cavity of the foaming mold would correspond to the surface of the connector platform and position the outer cover portions/connector platform assembly such that a finished appearance would be obtained directly from the mold.

A further alternative preferred embodiment is provided wherein the trim panel is formed by placing the connector platform/outer cover portion assembly into the cavity of a mold and forming a substrate behind the assembly by injecting RIM urethane reinforced with glass fibers.

An exemplary automotive interior trim panel is shown in FIG. 1 at reference character 10. As shown, interior trim panel 10 comprises a door trim panel. Other examples of trim panels 10 include, but are not limited to, an instrument panel, a headliner, a quarter panel, a console, a door panel and a package shelf.

As shown in FIG. 2, the trim panel 10 comprises a flexible outer cover 12, a substrate 14 and an intermediate foam layer 16 disposed there between. Preferably substrate 14 is configured to attach or otherwise retain, either directly or indirectly (e.g. with fasteners), the trim panel 10 to another member of the vehicle, such as the vehicle body, and is sufficiently rigid to maintain the shape of the trim panel 10 and to be self-supporting upon installation and with use in the vehicle.

As best shown in FIG. 3, outer cover 12 comprises at least two outer cover portions, first outer cover portion 18 and second outer cover portion 20. The outer surfaces 62, 64 of outer cover portions 18, 20 are generally the aesthetic surfaces viewed by a vehicle occupant. With regards to cover materials, outer cover portions 18, 20 may comprise thermoset or thermoplastic polymers. Examples include, but are not limited to, polyacetal, polyamide, polyurethane, acrylonitrile-butadiene-styrene, polyethylene, polypropylene, polyester, polystyrene, thermoplastic olefins, thermoplastic elastomers, polyvinyl chloride, and polyphenylene oxide. Outer cover portions 18, 20 are preferably formed by a plastic forming process such as, but not limited to, spray coating, casting, rotational molding, slush molding, blow molding, vacuum forming, and thermo-forming.

Outer cover portion 18 and outer cover portion 20 may also comprise different colors, grain patterns, thicknesses, and/or materials. Examples of different materials include but are not limited to, cloth, leather, plastic skins, textiles, pile and the like. One outer cover portion may be softer or harder relative to the other, or one outer cover portion may comprise a continuous sheet or film while the other comprises a textile, depending on the type of vehicle and the conditions of use of that portion of the trim panel (scuff, wear, exposure to light, contact with a vehicle occupant).

Each outer cover portion 18, 20 preferably comprises a plurality of receptacles 22, 24, respectively. As shown, receptacles 22, 24 comprise through-holes. As shown in FIG. 3, receptacles 22, 24 are disposed adjacent and along opposing contoured joint line edges 26, 28 of outer cover portions 18, 20. Also as shown in FIG. 1, opposing joint line edges 26, 28 extend across the face 30 of trim panel 10. As shown in FIG. 4, receptacles 22, 24 are preferably formed perpendicular to the cross-sectional thickness 32, 34 of outer cover portions 18, 20, respectively.

Also as shown in FIG. 4, a joint assembly 8 is formed from outer cover portions 18, 20 when are each joined to a connector platform 36. Connector platform 36 preferably comprises a plastic material and, more preferably, a thermoplastic. Examples of

thermoplastic include, but are not limited to, polyacetal, polyamide, polyurethane, polycarbonate, acrylonitrile-butadiene-styrene, polycarbonate-acrylonitrile-butadiene-styrene, polyethylene, polypropylene, polyester, polystyrene, thermoplastic olefins, thermoplastic elastomers and polyphenylene oxide. Connector platform 36 is preferably formed by a plastic forming process such as, but not limited to, injection molding or extrusion, but could also comprise a formed metal strip or a combination of formed metal and plastic.

As shown in FIGS. 3 and 4, connector platform 36 comprises a plurality of protrusions 38, 40 and extends along the face 30 of trim panel 10. Also as shown, the pattern of the protrusions 38, 40 on the connector platform 36 extending across the face 30 of the trim panel 10 coincides with the pattern of receptacles 22, 24 located on outer cover portions 18, 20.

In the above manner, as shown in FIG. 4, protrusions 38, 40 mechanically engage the receptacles 22, 24 of outer cover portions 18, 20 when the protrusions 38, 40 extend into the receptacles 22, 24. As shown, protrusions 38, 40 preferably comprise a locator device in the form of a post having a constant diameter down its length from top to bottom. In other words, in functioning as a locator device, protrusions 38, 40 orientate the outer cover portions 18, 20 relative to the connector platform 36 and connect outer cover portion 18 to outer cover portion 20 across the face 30 of the trim panel 10. As such, protrusions 38, 40 typically have a diameter from 0.0001" to 0.04" smaller than the diameter of the receptacles 22, 24 and, more preferably, a diameter from 0.001" to 0.01" smaller than the diameter of the receptacles 22, 24.

After protrusions 38, 40 extend into the receptacles 22, 24, preferably inner surfaces 42, 44 of outer cover portions 18, 20 make contact with the outer surfaces 46, 48 of the connector flange portions 50, 52 from which protrusions 38, 40 extend. More preferably, inner surfaces 42, 44 of outer cover portions 18, 20 are bonded to the outer surfaces 46, 48 of the connector flange portions 50, 52, and even more preferably, are autogenically bonded. In other words, bonded where the bonding substance comprises the material of the outer cover portions 18, 20 and/or the connector platform 36 themselves, as opposed to the use of separate materials such as adhesives.

In order to achieve autogenic bonding of the inner surfaces 42, 44 with the outer surfaces 46, 48, preferably an interface (i.e. contact location) between the two materials is subjected to heat and pressure. By application of heat and pressure to the cover portions 18, 20 and/or the connector platform 36, at least the surface portion of the cover and/or connector

subjected to the heat softens and/or melts to give it adhesive properties. Typically, a thin layer of melt on at least one of the plastic surfaces to be joined is created, at which time the cover portions 18, 20 and the connector platform 36 may be pressed together. This melt is subsequently cooled and bonds the surfaces, at which time the clamping force is removed.

5 The above description may be more appropriately characterized as thermal autogenic bonding. In other words, autogenic bonding is achieved by the application of heat to at least one of the items to be bonded. Furthermore, the temperature at which thermal autogenic bonding occurs may be referred to as the "thermal autogenic bonding temperature".

10 Autogenic bonding may also be performed without heat, for example, by means of a suitable solvent applied to the item(s) to be bonded which "softens" the bonding surface. Adhesion is attained by evaporation of the solvent, absorption of it into adjacent material, and/or diffusion of liquefied polymer molecules or chain segments across the interface.

15 While autogenic bonding as described above is the preferred bonding method, it should be understood that bonding of the inner surfaces 42, 44 with the outer surfaces 46, 48 may be accomplished by any method known in the art, autogenic or not, such as, but not limited to, vibration welding, ultrasonic welding, high-frequency welding, electromagnetic welding, induction welding, friction welding, hot-gas welding, hot-plate welding, heat staking, adhesive bonding, or mechanical fastening.

20 Once the outer cover portions 18, 20 are joined to the connector platform 36, in the preferred method of manufacturing trim panel 10, they are next placed in a mold cavity 54 of a mold assembly 56. In other words, a mold assembly 56 which comprises a first mold half 58 on the front side of the part to be formed and a second mold half 60 on the opposing side of the part to be formed, generally referred to as the female and male mold halves. As shown in FIG. 5, the outer surfaces 62, 64 of outer cover portions 18, 20 are placed in contact with mold surface 66 of first mold half 58 while outer surface 68 of substrate 14 is placed in contact with mold surface 70 of mold half 60. Upon positioning of the outer cover portions and the substrate within mold cavity 54, an open space 72 is created between the inner surfaces 42, 44 of outer skin portions 18, 20 and the inner surface 74 of substrate 14 which is eventually occupied by foam 16.

25 Foam layer 16 is preferably formed by introducing a foam, or more preferably, a foam precursor material into open space 72. Preferably, the foam precursor is a urethane foam precursor which is introduced using a reaction injection molding or low pressure foaming process as known in the art. After the urethane foam precursor is introduced, the reactive

constituents, a polyol and isocyanate, begin to react and the subsequently created foam material flows and expands to fill the open space 72, thus bonding outer skin portions 18, 20 to substrate 14 while at the same time flowing around and preferably bonding to the exposed surfaces of connector platform 36, thus securing all the individual components in place relative to one another. Panel substrate 14 may be of any materials known to those skilled in the art. Examples include, but are not limited to, plastic, metal, paper, woodstock, chip board and the like.

Foam layer 16, which may be characterized as having a low density and generally flexible or semi-rigid by virtue of its cushion or padding effect, preferably exhibits the following properties per Table 1.

Table 1

<u>Property</u>	<u>Test Method</u>	<u>Value</u>
Density	ASTM-3574-95	0.016 - 0.288 g/cm ³
Ultimate Elongation	ASTM-3574-95	Greater than 10%

With regards to measuring density, while any suitable test method may be used, the preferred test method is that of ASTM-3574-95, Test A – Density Test. With regards to range of density values, while the preferred value identified above is from 0.016 to 0.288 g/cm³, more preferably the value is from 0.06 to 0.15 g/cm³. With regards to the measured value, it is noted that the above values correspond to that of any single specimen (taken from any location within the trim panel 10), either an interior density specimen or a section density specimen as defined in ASTM-3574-95, and not the calculated median of more than one measured specimen. This is in accordance with ASTM-3574-95, paragraph 11.1 which calls for a single specimen to be tested.

With regards to measuring ultimate elongation, while any suitable test method may be used, the preferred test method is that of ASTM-3574-95, Test E – Tension Test. With regards to the range of elongation values, the preferred value identified above is greater than or equal to five percent (5%), more preferably the value is greater than or equal to ten percent (10%), and even more preferably the value is greater than or equal to twenty-five percent (25%) ultimate elongation. With regards to the measured value, it is noted that the above values correspond to that of any single specimen (taken from any location within the trim panel 14), as defined in ASTM-3574-95, and not the calculated median of more than one measured specimen. This is in accordance with ASTM D-3574-95, paragraph 48.1 which calls for three specimens to be tested and the median value to be reported.

Alternatively, the trim panel may be preferably formed using the reaction injection molding (RIM) process to form the substrate 14 and backing layer 16 in a single step. This may be carried out by attaching the outer cover portions to the connector platform, locating that assembly in the cavity of a preferred metal mold and backfilling the mold with a glass-reinforced RIM composition to form a semi-rigid self-supporting panel. While a glass-reinforced RIM composition is preferred, compositions using other types of reinforcement or without any reinforcement may be used.

In order to properly locate connector platform 36 relative to mold assembly 56, preferably connector platform 36 comprises a receptacle 76 which mechanically engages a protrusion 78 extending from mold surface 66 of first mold half 58 when the protrusion 78 extends into the receptacle 76. As shown in FIG. 5, receptacle 76 preferably comprises a locator device in the form of a U-shaped recess with a constant width along its length. In other words, in functioning as a locator device, receptacle 76 orients the connector platform 36 relative to the first mold half 58 and side-to-side as well as up-down (x, y axes) relative to the substrate 14.

More preferably, in order to orient the connector platform 36 relative to the outer surface 68 of the substrate, base portion 80 of the receptacle 76 preferably contacts against the inner surface 74 of the substrate 14 when mold assembly 56 is closed. Moreover, the outer surface 82 of the base 80 more preferably develops a seal against inner surface 74 of the substrate 14 to prevent foam 16 from extending therebetween and also to keep inner surface 82 of the base 80 parallel to the inner surface 74 of the substrate 14 to prevent the connector platform 36 from being tilted relative to the face 30 of the trim panel 10.

As shown in FIG. 2, connector platform 36 preferably interferes with a portion of the base 84 of a U-shaped recess 86 extending across the face 30 of trim panel 10, with the remainder of the base 84, as well as side wall portions 88, 90 of the recess 84 comprising outer cover portions 18, 20, respectively. In this manner, upon installation, the head portion 92 of a T-shaped joint cover 94 may be located in the recess 84 with the outer surface 96 of the joint cover 94 substantially flush (i.e. within plus or minus 1 mm) with the outer surfaces 62, 64 of outer cover portions 18, 20.

In order to connect joint cover 94 to trim panel 10, preferably base 80 of connector platform 36 and substrate 14 comprise one or more coinciding through-holes 98, 100 through which deformable snap tabs 102 located along the bottom surface 104 of leg 106 of joint cover 94 extend. Joint cover 94 is aligned with U-shaped recess 86 and deformable snap tabs

102 are engaged into through-holes 98, 100 such that arrow-tip snap tabs portions 108, 110 deform inwards towards one another. Once joint cover 94 is seated in recess 86, the arrow-tip snap tab portions 108, 110 snap outward to engage and lock against the outer surface 68 of substrate 14, the snap tab portions 108, 110 having passed through through-holes 98, 100.

5 Alternatively to, or in combination with the use of snap tabs 102 discussed above, the distal end surfaces 116, 118 of protrusions 38, 40 may be bonded to the inner surfaces 120, 122 of head portion 92 of joint cover 94 to connect the joint cover 94 to the trim panel 10. Other types of fastening devices than snap tabs may also be employed, such as, metal tangs, screws and nuts, grommets and the like.

10 In an alternate embodiment, the present invention may be used with plastic, leather, fabric or other materials to form aesthetic trim panels having multiple textures and appearances, but without the need for a reacting polymer composition to join the substrate and skin layers together. In this embodiment, a connector platform 36 engages with trim panels or cover portions 18, 20 to locate and attach these panels to each other. If the resultant
15 assembly 12 comprises injection molded or metal panels that are relatively rigid and self supporting, it may be attached directly to the vehicle body. When softer more flexible materials are desired for outer cover portions 18, 20, such as thin plastic skins, textiles or laminates of thermoplastic skin and foam, the connector platform 36 may be employed to locate the cover portions 18, 20 to one another through alignment and engagement of
20 protrusions 38, 40 with through-holes 22, 24. The resulting assembly 12 may then be directly adhered to the surface 74 of the substrate 14 using any common adhesive compatible with the plastic, textile, leather or metal which makes up the cover portions 18, 20 and the substrate 14.

25 As in the proceeding embodiment, the connector platform 36 may be inverted such that its outside surface 82 becomes the finish surface for the joint line of the panel 10 or a joint cover 94 may be connected to the connector platform 36 by engaging snap tabs 102 through-holes 98, 100 in the substrate 14.

30 A further alternative embodiment may comprise a hard panel substrate 14, the lower portion (below the belt line) of which has a finished, grained aesthetically pleasing appearance. This substrate 14 may then become lower cover 20 while the upper portion of substrate 14 may have an upper cover portion 18 and a connector platform 36 fastened or adhered to provide a soft surface thereon. In this embodiment, connector platform 36 may be attached to upper cover 18 by locating protrusion 38 in through-hole 22. This assembly 12

may then be aligned with and attached to the upper portion of the hard panel 14 by locating protrusion 40 in hole 24 to cover the upper portion and align with the lower hard portion 20.

As described herein, a trim panel comprising a multitude of materials is provided through the use of a connector platform which attaches and locates cover portions of trim panels to each other. The resulting trim panel is dimensionally registered and has an aesthetically pleasing appearance. In addition, a joint for a trim panel to ensure dimensional registration and a pleasing finished appearance is provided.

Thus, in the preferred embodiment, a connector platform 36 is disclosed, the connector platform 36 in cross-section comprising a U-shaped receptacle 76 (see FIG 2) having a base portion 80 and side wall portions 112, 114. Furthermore, the connector platform 36 further comprises flange portions 50, 52 extending perpendicularly outward from side wall portions 112, 114 and parallel to the entry to the receptacle 76. Furthermore, the flange portions 50, 52 further comprising protrusions 38, 40 extending therefrom, the protrusions extending perpendicular to the flange portions 50, 52 and parallel to the side wall portions 112, 114 of the receptacle 76.

An alternate embodiment of the invention uses the platform connector as the final joint cover or trim bezel by inverting the assembly procedure of the outer covers to the joint connector. The platform connector would then extend from the outer surface of the outer covers through the inner surface of the outer covers. In this embodiment, locating grooves in the cavity of the foaming mold would position the connector protrusion 38, 40 relative to the substrate and the outer surface 82 of the connector platform 36 would seal tightly against the mold cavity surface 66 to form a finished appearance directly from the mold.

The description and drawings illustratively set forth our presently preferred invention embodiments. We intend the description and drawings to describe these embodiments and not to limit the scope of the invention. It should be understood that all features of the individual embodiments can be exchanged between embodiments within the scope of this invention. Those skilled in the art will also appreciate that still other modifications and variations of the present invention are possible in light of the above teaching while remaining within the scope of the following claims. Therefore, within the scope of the claims, one may practice the invention otherwise than as the description and drawings specifically show and describe.

What is claimed is:

1. A joint for a trim panel comprising:

5 a first outer cover having an inner surface, an outer surface and a connector portion formed therein;

a second outer cover having an inner surface, an outer surface and a connector portion formed therein;

10 a connector platform having a first connector portion and a second connector portion, the first connector portion connected to the first outer cover connector portion and the second connector portion connected to the second outer cover connector portion.

15 2. The joint for a trim panel of claim 1 including a joint cover overlying the connector platform, the joint cover covering the connection between the connector platform first connector portion and the first outer cover connector portion and the joint cover covering the connection between the connector platform second connector portion and the second outer cover connector portion.

3. A joint for a trim panel comprising:

20 a first outer cover having an inner surface, an outer surface, a joint line edge and a connector portion formed therein, the connector portion comprising a plurality of receptacles disposed along the first outer cover joint line edge, the receptacles comprising through holes;

25 a second outer cover having an inner surface, an outer surface, a joint line edge and a connector portion formed therein, the connector portion comprising a plurality of receptacles disposed along the second outer cover joint line edge, the receptacles comprising through holes;

a connector platform having a first connector portion and a second connector portion, the first connector portion comprising a plurality of protrusions and the second connector portion comprising a plurality of protrusions;

30 wherein the protrusions of the first connector portion of the connector platform extend into the receptacles of the first outer cover to form a connection between the connector platform first connector portion and the first outer cover connector portion; and

wherein the protrusions of the second connector portion of the connector platform extend into the receptacles of the second outer cover to form a connection between the connector platform second connector portion and the second outer cover connector portion.

5 4. The joint for a trim panel of claim 3 including a joint cover overlying the connector platform, the joint cover covering the connection between the connector platform first connector portion and the first outer cover connector portion and the joint cover covering the connection between the connector platform second connector portion and the second outer cover connector portion.

10 5. A trim panel comprising:
 a first outer cover;
 a second outer cover;
 a connector platform;
15 a joint comprising said first outer cover and said second outer cover connected to said connector platform;
 a substrate held in spaced relationship to said first outer cover and said second outer cover;
 said spaced relationship comprising foam.

20 6. The trim panel of claim 5 including a joint cover overlying said connector platform.

25 7. The trim panel of claim 6 wherein said joint cover overlying said connector platform includes covering the connection between the first outer cover and the connector platform and the connection between the second outer cover and the connector platform.

30 8. A trim panel comprising:
 a first outer cover;
 a second outer cover;
 a connector platform;
 a joint comprising said first outer cover and said second outer cover connected to said connector platform;

a substrate formed directly behind said first outer cover and said second outer cover, comprising a reaction injection molded plastic composition.

5 9. The trim panel of claim 8 including a joint cover overlying said connector platform.

10 10. The trim panel of claim 9 wherein said joint cover overlying said connector platform includes covering the joint between the first outer cover and the connector platform and the connection between the second outer cover and the connector platform.

11. The trim panel of claim 8 wherein said reaction injection molded plastic composition is reinforced with fibers.

15 12. The trim panel of claim 8 wherein said reaction injection molded plastic composition comprises polyurethane.

13. A method for forming a joint for a trim panel comprising:
providing a first outer cover having an inner surface, an outer surface and a connector portion formed therein;

20 providing a second outer cover having an inner surface, an outer surface and a connector portion formed therein;

providing a connector platform having a first connector portion and a second connector portion,

25 connecting the first connector portion to the first outer cover connector portion and connecting the second connector portion to the second outer cover connector portion.

30 14. The method of claim 13 further including providing a joint cover and overlying the connector platform with said joint cover, wherein the joint cover covers the connection between the connector platform first connector portion and the first outer cover connector portion and the joint cover covers the joint between the connector platform second connector portion and the second outer cover connector portion.

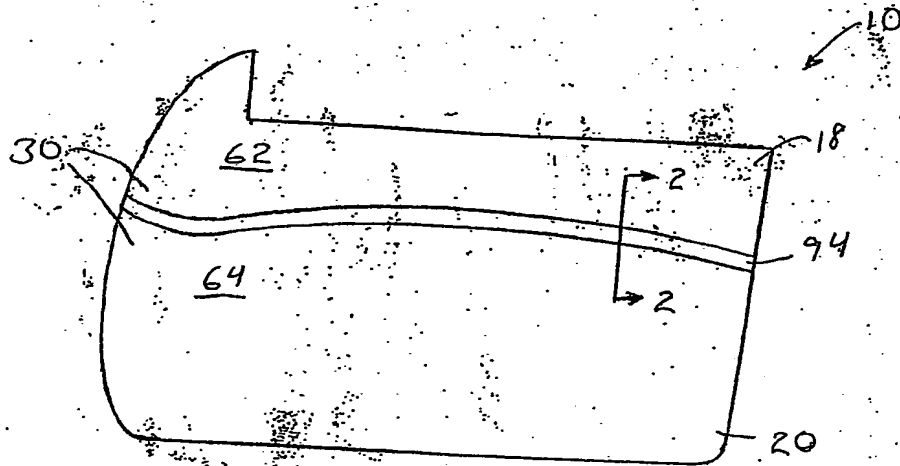


FIG. 1

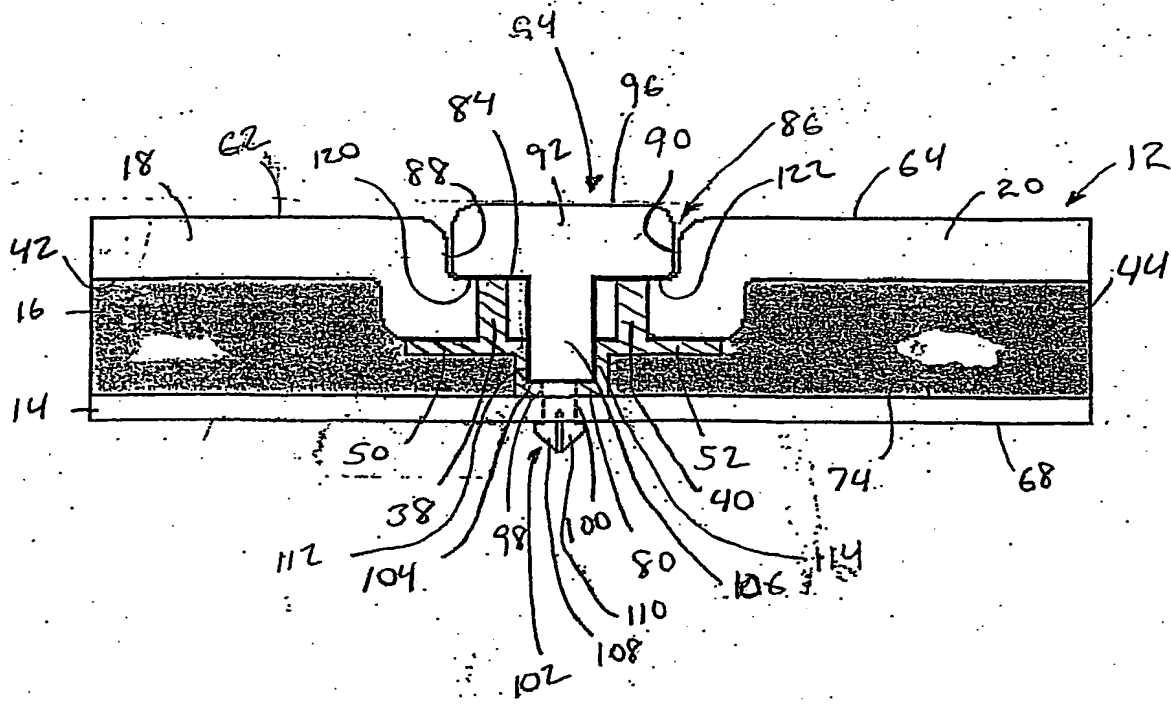


FIG. 2

FIG. 3.

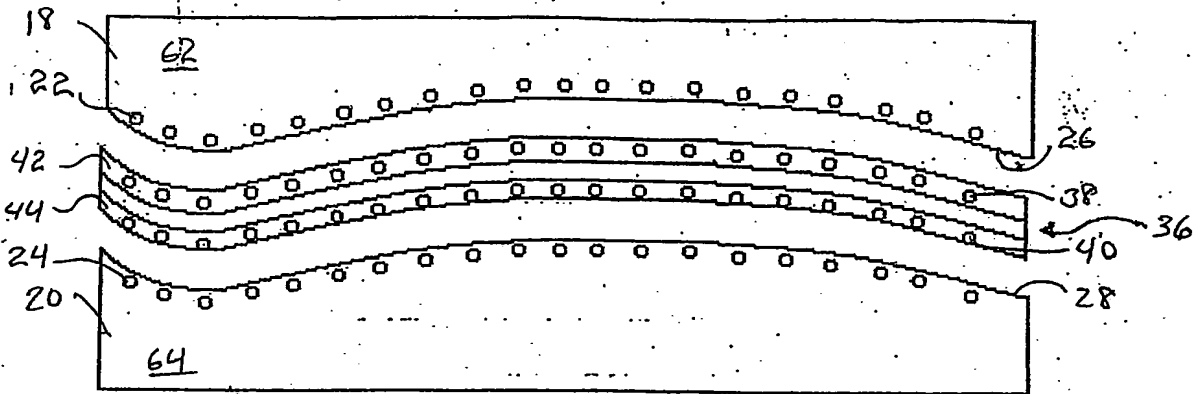


FIG. 4.

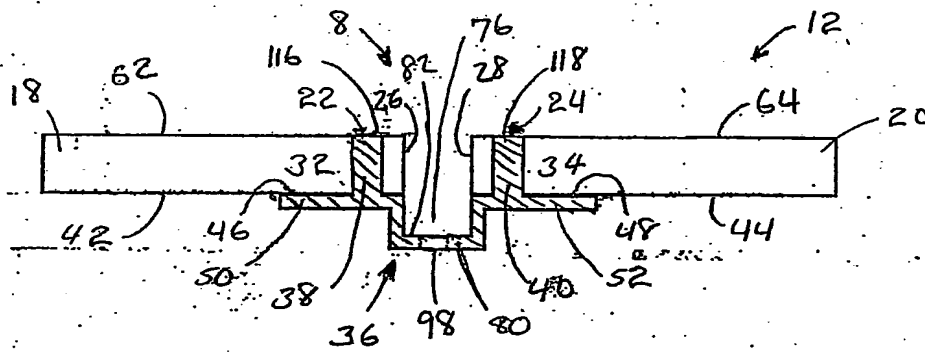
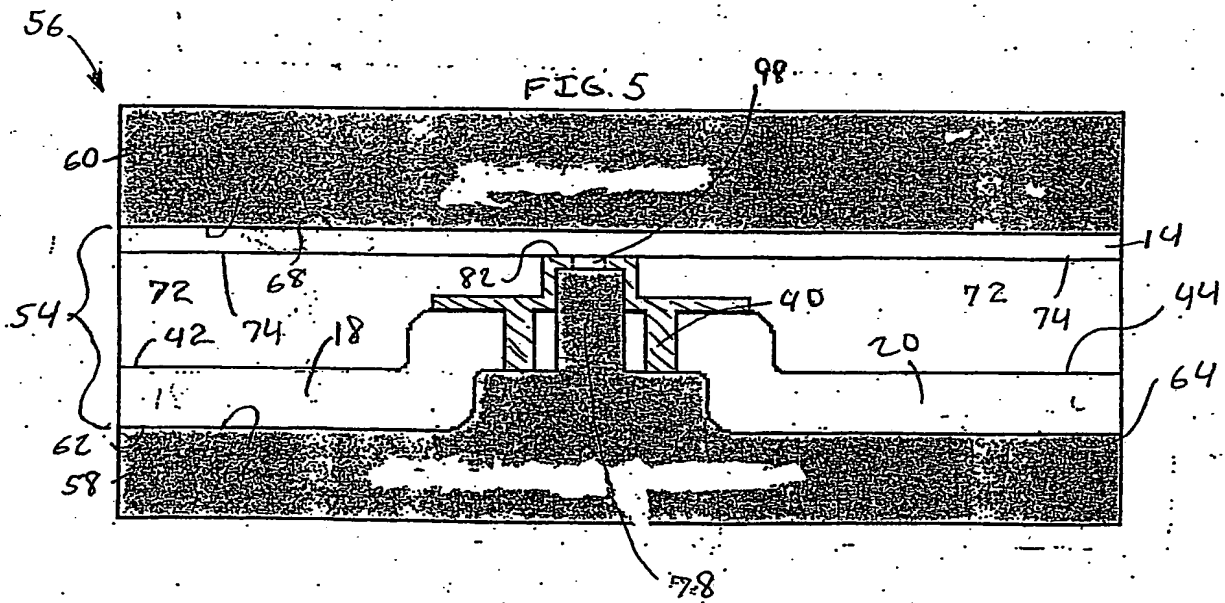


FIG. 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/00424

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : E04D 1/36

US CL : 52/459, 396.04, 716.5, 465, 466, 468, 470

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 52/459, 396.04, 716.5, 465, 466, 468, 470

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A <input checked="" type="checkbox"/>	US 4,411,944 A (MOORE) 25 October 1983 (25.10.1983)	I-14

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

13 April 2003 (13.04.2003)

Date of mailing of the international search report

17 JUN 2003

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks

Box PCT

Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

Carl Friedman

Telephone No. (703)308-0839